

THE DENTAL PRACTITIONER AND DENTAL RECORD

Vol. VI, No. 10

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THE DENTAL PRACTITIONER AND DENTAL RECORD

Vol. VI, No. 10

June, 1956



EDITORIAL

THE GENERAL DENTAL COUNCIL

WITH the passing of the new Dental Act by Parliament the dental profession enters a new era. The elections and appointments for the constitution of the new General Dental Council are in progress, and an article on the new act appears in this issue. There is no doubt that this is an important step in the life of the profession for it gives us complete autonomy and independence and we are now a self-governing body. This fact, however, gives us more responsibility to shoulder at a time when many vital decisions will have to be taken. With the fine record and achievements of the Dental Board of the United Kingdom behind them, the new dental council will have a proud beginning, but the next ten years will be as important as the first ten years after 1921. The colossal edifice of the national health scheme has to be maintained with a possible dwindling dental profession. A massive sudden demand was made for nation wide dental treatment in 1948. The demand is still there and will remain so, but since its inception very little has been done to create a dental profession large enough to cope with all the work necessary. Despite all the difficulties the profession has performed a really amazing feat in dealing with all the dental treatment necessary during the past eight years of national health insurance. It will be some time before the report of the Government commission of inquiry into the number of dental students appears

and it will take possibly ten years before any effects of its findings are felt. If by chance there is a decline in the number of dental surgeons in the country after 1958 (ten years after the service commenced), what is to be our future policy? It is easy to sit back and say all is well with the world, but at some not too distant date a decision of the utmost importance will have to be taken by the new General Dental Council. The future of the profession for years to come will depend upon it. We trust that the newly selected body that will represent us will meet the challenge of its day and fulfil the promise of the past. Are we to go forward to a newly enriched profession with a deep belief in ourselves and our work, or are we to look back into the dark past and find ourselves watered and diluted down to a shadow of our former selves? It is of supreme importance that each and all of us record our vote and return men of wide knowledge who will not be afraid of voicing their opinions and accepting this high responsibility.

EXAMINATION RESULTS THE UNIVERSITY OF LIVERPOOL

April, 1956

Degree of Bachelor of Dental Surgery (Third Examination, Part I):—Danchin, N.; Vega, G. A.

Licence in Dental Surgery (Third Examination, Part I):—Kent, R. F.; Wookey, C. P.

EFFECT OF VARIOUS DENTURE CLEANING SOLUTIONS ON CHROME COBALT ALLOYS

By J. F. C. MORDEN,

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and J. OSBORNE,

Professor of Dental Prosthetics, University of Birmingham

It has been observed that chrome cobalt denture alloys show signs of corrosive attack when exposed to certain proprietary denture cleaning solutions and antiseptics. In one

to suggest that this is, at present, a serious problem. It was felt, however, that a study of the effects of different cleaning solutions upon two commonly used alloys of this class,

Table I.—SOLUTIONS USED

No.	NAME	DESCRIPTION	PREPARATION OF SOLUTION	SOLUTION USED
1.	Steradent	White powder containing per salts in an alkaline medium	1 'cap' of Steradent powder in 250 ml. tap water at approximately 60° C.	40 ml. fresh solution for each immersion
2.	Milton Denture Powder	White powder containing sodium-per carbonate, carbonate and chloride, trisodium phosphate and a wetting agent	1 'cap' of Milton Denture Powder in 40 ml. tap water at approximately 60° C.	
3.	Milton Antiseptic	1 per cent solution of sodium hypochlorite and a trace of free alkali	5½ ml. Milton Antiseptic in 250 ml. cold tap water	40 ml. fresh solution or each immersion
4.	Parazone	Solution with "a hypochlorite base"	5½ ml. Parazone in 200 ml. cold tap water	40 ml. fresh solution for each immersion
5.	Denclen	Pink coloured solution containing "a combination of certain dilute acids"	None	40 ml. of Denclen used indefinitely for successive immersions
6.	Denclen	As above	None	Pledget of cotton-wool, soaked in Denclen, rubbed over polished surface of specimen for 1 minute, before washing in water

case the history of a clasp fracture was associated with immersion of the cast chrome cobalt denture in a hypochlorite cleaning solution, but evidence of the significance of any corrosive action could not be established. However, in departments which have made some eight hundred dentures in this alloy during the past five years, there has been no further evidence

under controlled laboratory conditions, might yield information which would help when advising patients which solutions might most safely be used with chrome cobalt dentures.

The alloys selected in this investigation were Croform and Virilium, and the cleaning solutions considered are listed in Table I. Not all of these solutions are recommended by the

makers for cleaning dentures; in particular the manufacturers of Milton Antiseptic and Parazone do not advise the use of their products on dentures of any kind. It has, however, been the experience of the writers that some patients, often those enthusiastic about oral hygiene, have preferred these solutions for denture cleaning. Accordingly it was considered advisable to include these products, along with others specifically recommended for the purpose, in this project.

EXPERIMENTAL PROCEDURE

Two methods frequently employed in experimental work on corrosion were used. The first was a weighing method, revealing changes in weight after varying periods of immersion, while the second was metallurgical examination, both macroscopic and microscopic, before and after the solutions had been allowed to act. The experimental procedure was developed so that both approaches could be carried out simultaneously on the same specimens.

Preparation of the Specimens.—Alloy specimens were cast in the form of rectangular plates approximately 1 in. \times $\frac{1}{2}$ in. \times $\frac{1}{8}$ in. using the technique and materials recommended by the respective manufacturers. All surfaces of these specimens were polished following the procedure normally used in the dental laboratory (Osborne and Lammie, 1953). In addition one large surface of each specimen was ground flat and hand polished following accepted metallurgical procedure, the final mirror finish being obtained with a suspension of Diamantine in water.

The Weighing Method.—At the commencement of the experiments all the specimens were degreased by immersion in acetone; after removal, residual acetone was evaporated in a stream of warm air. They were then placed on a tray and dried in an open oven for not less than thirty minutes at a temperature of approximately 150° C. After cooling in a desiccator the specimens were weighed.

The castings were then immersed in glass specimen jars, which contained the denture cleaning solutions prepared according to the manufacturer's directions as detailed in *Table*

I. The specimens were suspended in holders made from thin section glass rod in order to permit the free contact of the solution on all surfaces. Only in the case of the "Dencen wipe" was this procedure not followed. In this single instance the cleaning solution was applied on a pledget of cotton-wool and rubbed for one minute. The Dencen was then thoroughly washed off with distilled water and after the test piece had been dried it was stored in an empty specimen jar. It is stressed that this is the method of using Dencen advised by the manufacturers. A specimen was also immersed in Dencen; this was done to observe if any corrosive action would follow the misuse of this material, and it must be emphasized that this procedure is quite contrary to the directions of the makers.

It was found convenient to immerse the specimens for lengthy periods and, in all, eight periods were employed as shown below:—

1st period	42 hr.	5th period	88 hr.
2nd "	42 "	6th "	48 "
3rd "	41 "	7th "	94 "
4th "	41 "	8th "	66 "
Total		462 hours	

It will be noted that the total period of immersion is very small when compared with the time a denture might be immersed in a cleaning solution during its useful life to the patient. This is, however, justified on the grounds that the experimental methods used were capable of showing minute changes. Further it was felt that it was necessary to use a short immersion time as considerable numbers of chrome cobalt dentures are being inserted at the present time and some positive indication to a wise choice of cleaning solution was required immediately.

After each immersion the specimens were removed from the solutions and washed with distilled water. They were then rubbed thoroughly for one minute with a brush to remove any adherent deposits. Each specimen was again subjected to the degreasing and drying procedures described, and was again weighed. A control specimen of each alloy was prepared and subjected to the same cleaning, drying, and weighing sequences as the pieces under test, but was allowed to stand

in air rather than be immersed in a solution. The "loss of weight" figures for this specimen were very small but the others were corrected accordingly.

The Metallurgical Examination Method.—Although for descriptive purposes this method is treated separately it should be understood that it was carried out simultaneously on the same specimens as used in the weighing method. In this way it was hoped to verify the results of each approach and perhaps explain the findings of one in terms of the other.

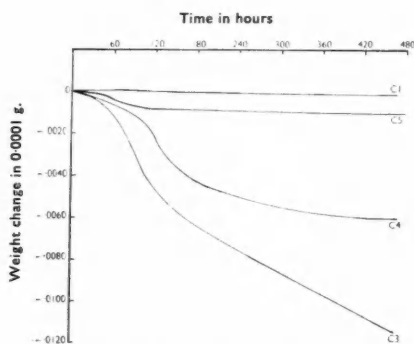


Fig. 1.—Graph showing results of immersion of Croform alloy. C₁—Steradent, C₃—Milton Antiseptic, C₄—Parazone, C₅—Dencen (immersion).

Macroscopic Examination.—The specimens were examined with the naked eye and also at low magnification, before and after successive immersions. In the first instance the quality of the casting and the effects of polishing were particularly noted, while after immersion etching effects were the main point of assessment.

Microscopic Examination.—Before the first immersion the metallurgically prepared surfaces of each specimen were examined microscopically. A field was selected in each case and its exact location determined on the mechanical stage of the Vicker's Projection Microscope. It therefore became possible to examine the same field after successive immersions and to make accurate comparisons. Where suitable, areas showing some form of defect, such as porosity or shrinkage cracking, were selected, in order to observe if the effect

of the cleaning solution was in any manner influenced by their presence. Photomicrographs of every specimen were taken initially and after each period of treatment at a magnification of $\times 104$; special effects were observed and photographed at higher magnifications.

RESULTS

The Weighing Method.—Graphs were prepared showing the effect of the successive immersions on each alloy. It was assumed that

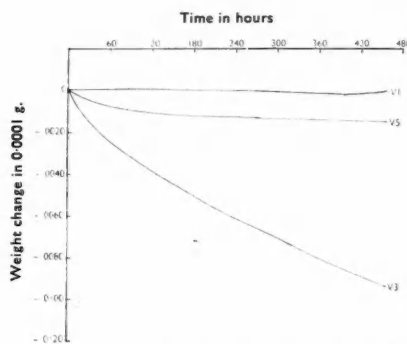


Fig. 2.—Graph showing results of immersion of Virilium alloy. V₁—Steradent, V₃—Milton Antiseptic, V₅—Dencen (immersion).

the surface area of all the specimens was equal, and results were therefore plotted on the basis of "loss of weight" against time of immersion. Fig. 1 shows the results with Croform and Fig. 2, the results with Virilium.

The weighing method quickly established that there was negligible attack on either alloy by Steradent, Milton Denture Powder, and the Dencen wipe. Significant loss of weight was, however, observed with Milton Antiseptic, Parazone, and Dencen immersion. Milton Antiseptic produced the most pronounced effect on each alloy, the Virilium being attacked to only a slightly less degree than the Croform. The total losses were respectively Croform, 0.0114 g., and Virilium, 0.0095 g. In the case of Parazone it was surprising to discover appreciable loss of weight with Croform (0.0064 g.) and no significant change with Virilium. Dencen immersion showed

losses in both alloys, but these were less than with the hypochlorite media; the total losses were not significantly different, being 0.0011 g., in the case of Croform and 0.0015 g. with Virilium.

Metallurgical Examination Method—Macroscopic.—As cast and during preparation by polishing the Croform specimens appeared to be sounder than those of Virilium. In the

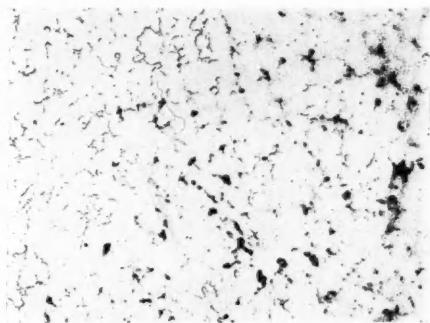


Fig. 3.—Porosity in vicinity of sprue attachment in Croform showing evidence of "ageing" surrounding the porosity. ($\times 70$.)

former very few blow holes were visible, but there was some slight contraction porosity on four of the specimens in the vicinity of the sprue attachment (Fig. 3). On the other hand the Virilium specimens showed more extensive and more pronounced contraction porosity (Fig. 4). In both cases after final preparation a faint dendritic pattern was observed at low magnification where the chromium carbides had polished in relief.

Only two macroscopic changes were noted after immersion, the first and most noticeable of which was a staining of both Croform and Virilium specimens in the case of Milton Antiseptic. Both alloys showed a loosely adherent black-brown deposit. In the second instance, Croform after immersion in Denclen developed a crazed appearance due to an etching effect at the grain boundaries.

Metallurgical Examination Method—Microscopic.—

Steradent.—Examination of the photomicrographs of both alloys before and after immersion showed no signs of staining or etching.

Milton Denture Powder.—With Croform there was evidence of slight etching. After the first immersion the porosity at the sprue junction became slightly more noticeable and the presence of two carbides was revealed. Three carbides (Cr_{23}C_6 , Cr_7C_3 , and Cr_3C_2) are known (Sully, 1954). Although the carbides revealed by the immersion were not identified chemically, it is probable that they were

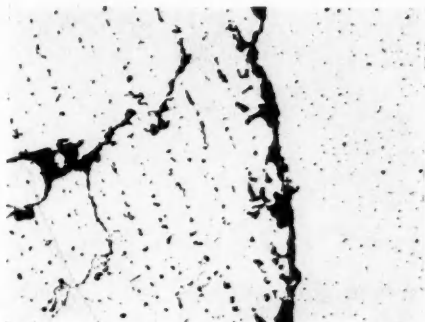


Fig. 4.—Virilium. Cracking associated with shrinkage. ($\times 69$.)

Cr_{23}C_6 and Cr_7C_3 , since Lane and Grant (1951) describe these as always being present in alloys of the Croform type. The structure surrounding the porosity in Fig. 3 was identified as the product of the "ageing" of Cr_7C_3 to form Cr_{23}C_6 , during slow furnace cooling. Some of the carbides stained a brick-red colour and showed a tendency to cubic form, while others appeared a faint pink.

With Virilium no change was evident.

Milton Antiseptic.—Three changes were noted in the case of the Croform test piece after immersion:—(a) Darkening of the carbides; (b) Development of grain boundaries; (c) Revelation of a lamellar eutectic at the grain boundaries particularly in the vicinity of the sprue porosity (Fig. 5).

The attack on the carbides commenced marginally and was accompanied by some distinct signs of solution of the matrix. With successive immersions the carbides became the centres from which an attack spread in widening circular fronts as shown in Fig. 6, which also shows a typical grain boundary.

In the vicinity of some porosity on the specimen, considerable staining occurred and this was revealed at high magnification to consist of marginal attack of the carbides,

which became sharply contrasted with the α phase. The stained area round the porosity likewise revealed little coring of the α phase and no "ageing".

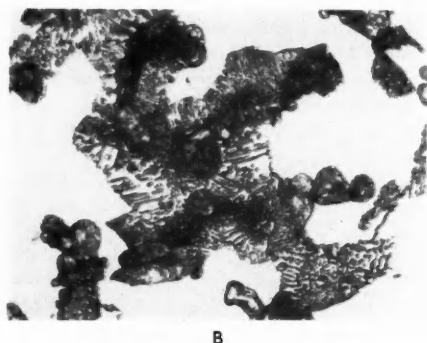
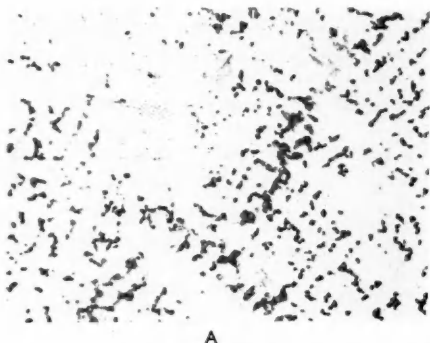


Fig. 5.—A, Croform showing eutectic at grain boundaries developed by action of hypochlorite solution. ($\times 69$.) B, The eutectic shown in A. ($\times 628$.)

associated with coring of α cobalt chromium phase. "Ageing" was also visible (Fig. 7).

Although the dark brown deposit formed with Virilium as with Croform, the effect on

Parazone.—With Croform it was most noticeable that the solution revealed differences in the carbide particles, many of which showed two constituents (Fig. 9). The eutectic

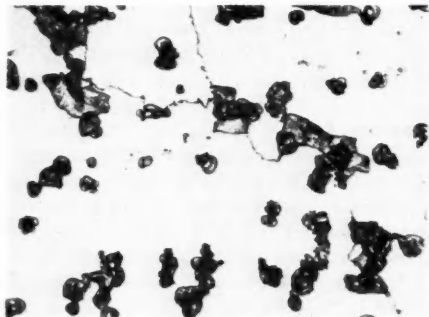


Fig. 6.—Croform. Showing the attack in "widening circular fronts" and typical grain boundary, after immersion in hypochlorite type solution. ($\times 298$.)

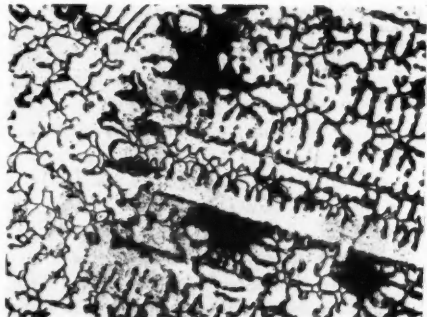


Fig. 7.—Croform. Stained area from hypochlorite immersion showing coring of α Co/Cr phase and "ageing". ($\times 298$.)

the microstructure was different. There was staining in the immediate vicinity of the porosity, and the grain boundaries etched up distinctly as before. The carbides, however, developed a purplish-grey colour, having a mottled appearance at first. There was no marginal attack and no corrosion of the matrix surrounding the carbides (Fig. 8),

observed with Milton Antiseptic was also revealed but much more lightly. There was no spread of corrosion from the carbides into the matrix, but the attack on the carbides commenced marginally.

In the case of Virilium the general appearance of the microstructure was similar to Croform. The carbides appear to have been

etched evenly and there was no eutectic observed; the grain boundaries were only lightly revealed. The defect shown in Fig. 4 appeared to have had no influence on the solution.

Denclen.—With Croform a network etching effect evidently associated with the grain



Fig. 8.—Virilium. Nature of hypochlorite solution attack on carbides of Fig. 6. ($\times 298$.)

boundaries was noted, but the carbides themselves were unaffected and not even discoloured. The etching was granular in nature and in some respects resembled the "ageing" effect noted on some of the previous Croform specimens (Fig. 10). There was also evidence of attack in the matrix areas between the carbide particles. The specimen showed sprue porosity and in the vicinity of this porosity the attack on the matrix was much more marked, revealing a well defined dendritic pattern, being therefore an indication of coring. The grain boundary effect was also more marked in this region.

The Virilium specimen also showed a dendritic pattern around the sprue porosity but here this was mainly delineated by staining. The fact that in the case of both Croform and Virilium the most marked coring was formed near the sprue porosity tends to suggest that the porosity is largely due to segregation. The only other noticeable feature of the Virilium microstructure was the etching of the grain boundaries and a slight darkening of the carbides.

Denclen Wipe.—Both alloys appeared to be quite unaffected by the treatment.

DISCUSSION

Confirmatory results were revealed by the weighing and metallurgical methods in all cases except that of Croform immersed in a solution of Milton Denture Powder. No significant change of weight was observed in this

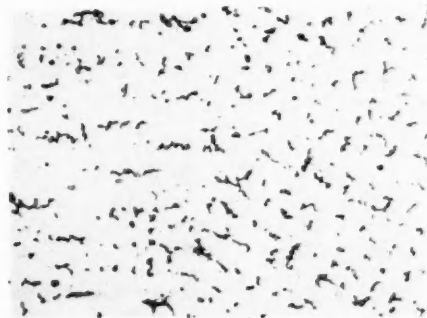


Fig. 9.—Croform. Eutectic and duplex nature of carbides revealed by Parazone solution. ($\times 69$.)

case although some slight microscopic changes were noted. It was, however, not considered that the combination of this evidence was

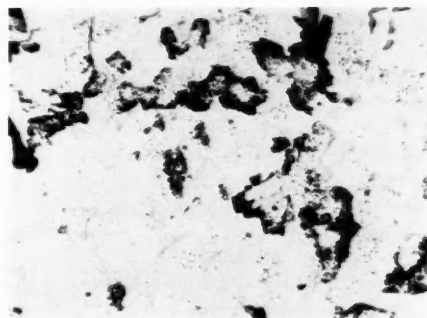


Fig. 10.—Croform. Grain boundary ageing effect revealed by immersion in dilute acid containing chloride. ($\times 320$.)

sufficient to advise against the use of Milton Denture Powder as a cleaning agent for use with chrome cobalt dentures.

It can therefore be concluded that Steradent, Milton Denture Powder, and Denclen Wipe can be safely recommended for use on chrome cobalt dentures. Since immersion in Denclen proved corrosive, the need for rigidly

adhering to the instructions of the makers is emphasized.

Milton Antiseptic, Parazone, and Denclen immersion showed significant weight losses and microscopic evidence of attack. It is interesting to note that these all contain a chlorine compound, and that Deloro Stellite (1952) describe chrome cobalt base alloys as being "active" in HCl unless the solution is very dilute. The reason for the different nature of the attacks produced by Milton Antiseptic and Parazone still requires elucidation.

CONCLUSIONS

When used as recommended by the makers, Steradent, Milton Denture Powder, and

Denclen can safely be used with chrome cobalt dentures. Milton Antiseptic, Parazone, and Denclen immersion are contra-indicated.

The writers would thank the makers of the products tested, for supplies used in this investigation and for providing useful information on composition.

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WOUND CONTAMINATION BY COTTON FIBRES*

By HENRY W. NOBLE, H.D.D., L.D.S.

Lecturer in Dental Anatomy and Histology, Glasgow Dental School

It is an acknowledged principle of surgical technique that, before closing an operation wound, care should be taken to ensure that no tissue debris or foreign matter remains to impede the healing of the lesion. An exception is made in the case of such substances as absorbent gel sponge or penicillin and sulphonamide preparations which are intentionally inserted to promote healing and which are eventually eliminated by the tissues. It has been shown that this principle applies, not only to macroscopical foreign bodies, such as swabs, tooth fragments, or portions of restorations, but also to minute quantities of talcum powder from the surgeon's gloves which may remain in the tissues and give rise to granulomatous lesions (Roberts, 1947; Mackey and Gibson, 1948; Walker, 1948). It is the intention of the present author to show that similar undesirable consequences may arise as a result of the inclusion of microscopical fibres of

cotton during an operation, and to present three cases where this has occurred.

Cotton is commonly used during an operation in the form of gauze, or pledgets of cotton-wool, and, in the latter, the cotton fibres are only loosely held together. Pledgets of cotton-wool are frequently used to absorb blood from a rough bone surface when vision is impaired by bleeding during an oral operation. In these circumstances it is not surprising that some cotton fibres remain caught on bone trabeculae and resist dislodgement by any subsequent syringing of the cavity.

Cotton is practically pure cellulose and is derived from the hairs and fibres which surround the seed of the cotton plant. Cellulose is a complex polysaccharide which forms the main constituent of the walls of plant cells. It does not occur in the animal body and is relatively insoluble and resistant to chemical agents. It can be decomposed by bacteria but cannot be digested by human agencies.

Case 1.—R. M., male, aged 30 years. This patient was referred to Glasgow Dental Hospital for treatment of a dental cyst in the 7-4 region. After removal of the cyst,

* A short communication read before the Odontological Society of Scotland, Edinburgh, January 12, 1956.

the wound was insufflated with penicillin and sulphonamide powder and a piece of absorbent gel sponge was placed in the cavity, which was closed by sutures. The tissue removed was submitted to pathological examination and was reported as an infected dental cyst.

Six weeks later, healing was considered unsatisfactory and the area was reopened and curetted. The tissue removed at this operation was then sent for pathological examination.

Microscopical examination revealed a mass of proliferating connective tissue, moderately infiltrated with chronic inflammatory cells and containing an area of unabsorbed gel sponge (Fig. 1) in addition to numerous particles which had stimulated a foreign-body giant-cell reaction (Figs. 2-4). Further examination of these particles under polarized light revealed that they were birefringent (see below). An initial attempt was made to isolate these particles by micro-incineration, but it was found that when heated to 250° C. they charred and, on heating to 500° C. they ignited and disappeared leaving no detectable residue. Other sections were treated for ten minutes with a solution of chlorinated soda, which attacked and dissolved the connective tissue present but left the particles unaltered and much more clearly visible. When these isolated particles were compared with the appearance of fibres of cotton-wool which had been embedded in paraffin wax and sectioned, there was seen to be a distinct resemblance. A microchemical test for cellulose which involved the treatment of a section for a few seconds with a 1 : 1 : 100

decided to re-examine sections from other cases where an original dental operation had been followed at a later date by a second operation in the same region, involving the removal of tissue. Records were available of five

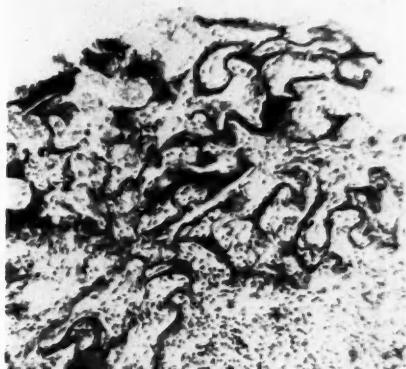
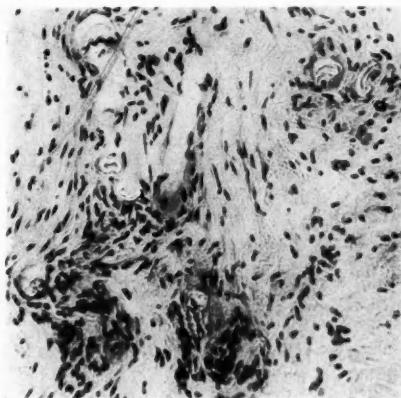


Fig. 1.—Area of unabsorbed gel sponge. Ordinary illumination. ($\times 152$.)



A



B

Fig. 2.—Group of cotton fibres showing proliferative response of fibrous tissue and sparse infiltration of chronic inflammatory cells. A, Ordinary; B, Polarized illumination. ($\times 136$.)

solution of iodine, potassium iodide, and water, followed by the application of a 2 : 1 solution of zinc chloride in water, yielded a positive result with the particles, staining a light blue colour.

The identity of the particles having been thus established, it seemed that the only logical explanation of their presence in this tissue was that cotton fibres had been allowed to contaminate the original operative wound made during the removal of the dental cyst. In view of this finding and of the fact that cotton-wool is so extensively used during dental operations, it was

such cases, two of which showed the same condition and are now presented.

Case 2.—J. Mc.B., male, aged 50 years.

An unerupted supernumerary tooth was removed from the palate in the region of the upper left central incisor. The cavity was insufflated with penicillin and sulphonamide powder and a piece of absorbent gel sponge was placed in position. At a subsequent appointment, healing was considered to be satisfactorily progressing and the patient was dismissed.

Four months later the patient returned and a discharge was seen to be coming from a sinus in the region of the operation wound. The area was reopened and curetted; the tissue was sent for pathological examination.

from section to section. Foreign-body giant cells were associated with many of the particles and, occasionally, smaller particles were seen as inclusions within a giant cell (Fig. 6).

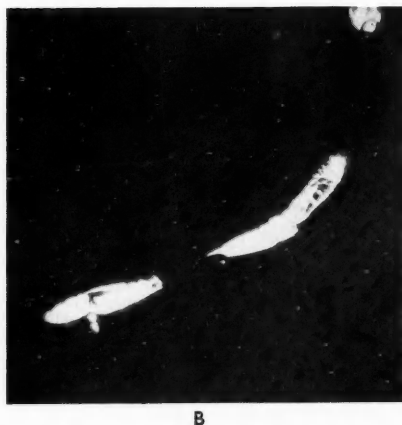
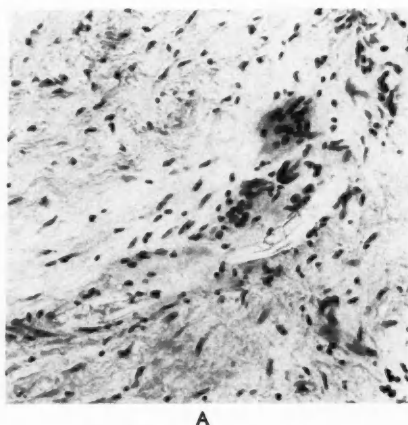


Fig. 3.—Cotton fibre sectioned obliquely and surrounded by several foreign body giant cells. A, Ordinary; B, Polarized illumination. ($\times 208$.)

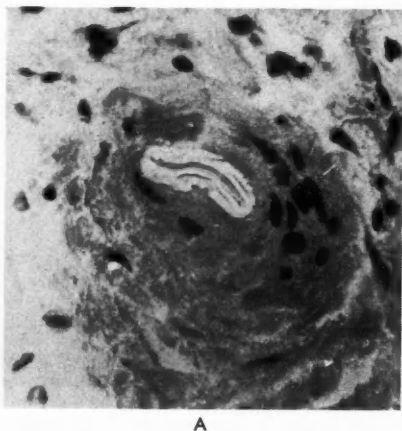


Fig. 4.—Cotton fibre sectioned transversely, showing flattened tubular structure and surrounded by a large giant cell. A, Ordinary; B, Polarized illumination. ($\times 960$.)

Microscopically the sections showed a mass of connective tissue, sparsely infiltrated with chronic inflammatory cells (Fig. 5 A) and this specimen was originally reported as consisting of chronic granulation tissue. Subsequent examination of this section by polarized light revealed numerous birefringent particles (Fig. 5 B), including two large clusters which were present throughout the serial sections, which were later examined. The size, shape, and number of the particles varied gradually

The behaviour of these particles upon micro-incineration was similar to that described in the first case and, when isolated by treatment with chlorinated soda and observed carefully under polarized light, their structure was again seen to be similar to sectioned cotton fibres.

Case 3.—P. McC., female, aged 27 years.

A dental cyst was removed from the region of the upper left lateral incisor. The wound was insufflated with penicillin and sulphonamide powder and a piece of

absorbent gel sponge was placed in the cavity, which was closed by sutures. The cyst was examined microscopically and was reported as an infected dental cyst. Healing commenced satisfactorily and the patient was dismissed.

particles had again been overlooked in the original examination of the sections (Fig. 7). Further serial sections were prepared and the particles were again seen to be present serially in most of the sections examined. These particles behaved similarly to those

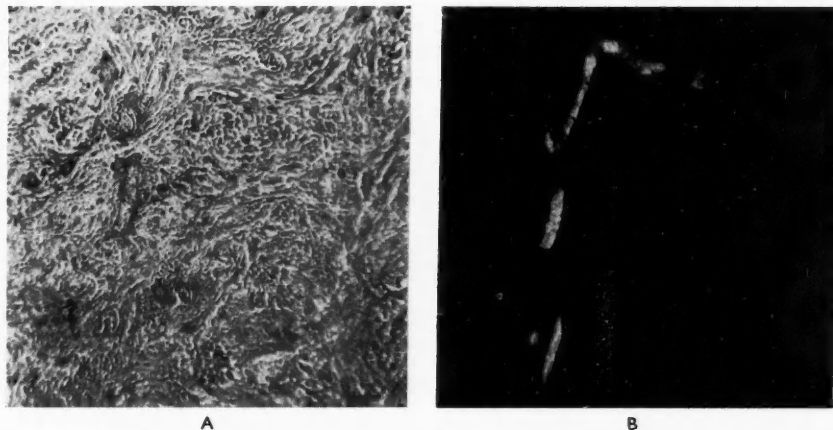


Fig. 5.—Shows inconspicuous appearance of cotton fibres when examined under ordinary light (A), in comparison with the same field under polarized light (B). ($\times 120$.)

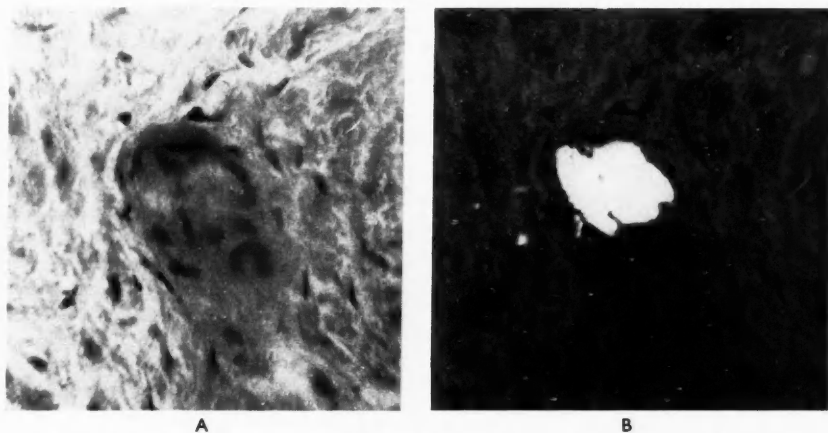


Fig. 6.—Cotton particles apparently included within the cytoplasm of a giant cell. A, Ordinary; B, Polarized illumination. ($\times 580$.)

Six months later the patient returned, there being a discharging sinus present in the area of the previous operation. A fresh incision was made and the soft tissue present in the previous cyst cavity was removed and sent for pathological examination.

Microscopically, this specimen consisted of relatively mature fibrous tissue with occasional areas of chronic inflammatory cell infiltration. When examined by polarized light it was found that the presence of birefringent

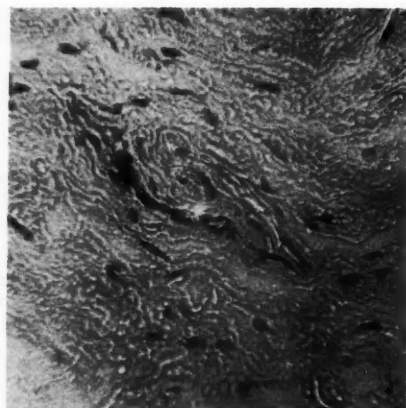
in the other cases when the various tests were applied, and were also identified as sectioned cotton fibres.

DISCUSSION

There are certain difficulties associated with the recognition and identification of cotton fibres in routine pathological sections. They

do not stain distinctly with hæmatoxylin or eosin and their small size and thinness when sectioned within a piece of tissue may sometimes render them almost invisible under the most careful scrutiny with ordinary light. Attention may be drawn to their presence only by the displacement of the adjacent tissues

any cotton fibres present stand out brightly illuminated as a result of their ability to rotate the beam of polarized light. This ability is also present to a lesser degree in certain of the tissues, such as collagen fibres and striated muscle, but they can be readily identified by reverting to normal illumination. Particles of



A



B

Fig. 7.—Cotton particle embedded in more hyaline fibrous tissue. A, Ordinary; B, Polarized illumination. ($\times 608$.)



Fig. 8.—Mounted cotton fibres observed under polarized light. ($\times 160$.)

and the presence of a foreign-body giant cell. Fortunately they can be readily detected by the use of polarized light. When the two polarizing prisms are crossed, giving a dark field,

talcum powder are also capable of rotating a beam of polarized light. In view of the dangers associated with the use of talcum powder, many operating theatres, including that in the Glasgow Dental Hospital, now use starch as a dusting powder for rubber gloves. Particles of talcum powder in a section may, however, be distinguished by their ability to withstand micro-incineration to a temperature of 600°C . and treatment with nitric acid, whereas cotton fibres are destroyed by either of these procedures. Confusion with any unabsorbed portions of absorbent gel sponge did not arise in the above cases. Microscopical examination of the brand of gel sponge used in Glasgow Dental Hospital (Allen & Hanburys Gelatin Sponge, B.P.C.) revealed that in sections it differed from the particles observed in appearance, that it stained readily with hæmatoxylin and retained the stain in mounted sections, and that it was not birefringent when viewed under polarized light. Identification is

sometimes possible at high magnifications if the normal structure of a cotton fibre is kept in mind. Each fibre is a flattened tubular band, 15-20 μ wide, and having slightly thickened, rounded edges (Fig. 8). Occasionally the characteristic cross-section of a fibre is to be seen (Fig. 4). When sections containing cotton particles are treated with chlorinated soda, most of the cells and tissues are removed as a result of the combination of the chlorine with the amino groups of the cellular and tissue proteins, with the formation of soluble chloramines. The cotton particles are unaffected by the chlorinated soda, which is, in fact, used as a bleaching agent during the production of cotton-wool. The result of such isolation of the cotton particles is that a much clearer picture of their structure under polarized light can be obtained than when they were embedded in the tissue of the section. Finally, the identification of cotton particles can be verified by the application of one of the microchemical tests for cellulose. Gatenby and Beams (1950) give several such tests and the one used in this investigation (see above) is attributed by them to Novopokrowsky.

The resistance of the cotton fibres to absorption or digestion by human agencies probably gives rise to the foreign-body reaction observed. Duszynski (1950) reported that the microscopical examination by polarized light of sections from 216 eyes operated on for glaucoma and subsequently removed, revealed the presence of cotton fibrils and talcum powder in 73 per cent of such eyes. The percentage was much lower in connexion with one particular operation (iridectomy), where the instrument technique limited contamination from glove talc and where the absence of bleeding obviated the use of cotton pledgets as sponges. He described the tissue reaction to cotton fibrils or talcum powder as fibroblastic and proliferative. Meade (1941) discusses the use of cotton as a non-absorbable suture material and states that it causes a minimal amount of cedema and cellular tissue reaction. Orr (1947), however, reports cases of granuloma caused by cotton sutures. Searcy, Carmichael, and Wheelock (1944) implanted cotton-wool subcutaneously in rats. The implant was examined

microscopically after a period of fifteen months and was found to have provoked a marked proliferative fibrous-tissue reaction infiltrated with lymphocytes and other chronic inflammatory cells.

CONCLUSION

It is difficult to assess the importance to be attached to the presence of the retained cotton fibres in the cases mentioned. While there is no doubt concerning the existence of the reaction which they provoke, there was also, in each of the cases mentioned, an infection present which made the second operation necessary from the clinical point of view. It is possible, however, that the contaminating fibres were partly responsible for the delayed healing of the tissues and that the infection supervened. Had this infection not been present, it is still probable that these cotton fibres and the reaction which they caused would have constituted an impediment to the satisfactory healing and repair of the tissue. Although material was available from only 6 cases, where a second operation had been necessary, it is to be noted that contamination of the previous operative wound had occurred in 3 of these cases. It is therefore suggested that such contamination may not be an infrequent occurrence and that care should be exercised in the use of cotton during an operation; particularly in a loosely bound form such as pledgets or sponges of cotton-wool.

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A REVIEW OF THE HISTORY OF PERIODONTOLOGY UP TO THE FOUNDING OF THE AMERICAN ACADEMY OF PERIODONTOLOGY IN 1914

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THE study of the history of periodontology is truly fascinating and stimulating. He who makes this study must be deeply impressed by the sincerity of purpose and the spirit of evangelism that have activated men drawn to periodontia. He will be astounded at many of the keen observations made, the practical knowledge evidenced, and opinions expressed by men centuries ago, so up-to-date are they according to modern lights.

Ancient history records that the Egyptians, Greeks, Romans, and Chinese all referred to periodontal disease, but not so the Hebrews. Hippocrates in 460 B.C. and Democritus in the first century A.D. recognized the association between lack of cleanliness and inflammation of the gums. Galen, A.D. 131, appears to have been the first to practise occlusal correction by grinding, for, if a tooth were projecting and in trauma, he used an iron file on it. Paul of Aegina in the seventh century, in addition to recommending the filing of protruding teeth, advised removal of tartar, avoidance of tainted and glutinous foods, and advocated the cleaning of the teeth, especially after the last meal of the day.

Abulcasis, a Moorish surgeon in Spain in the eleventh century, was quite an outstanding man, for he described calculus, and detailed its thorough removal with scalers which he designed. He also described a technique of wiring loosened teeth. Ambrose Paré in the sixteenth century outlined a technique for the use of scalers and directions for keeping the teeth clean. He used nitric acid and alcohol to remove deposits not removed by the scalers.

The eighteenth century marks the real beginnings of dentistry as an individual

profession. Pierre Fauchard ushered in this era and he has been termed the father of modern dentistry. In his two texts of 1728 he showed himself to be a man of keen observation, profound experience, and remarkable technical ingenuity. He was still influenced by many of the ideas of his time and he did not add much to the diagnosis and treatment of periodontal disease. He was the first to advocate the use of a high-urea mouthwash, not for the control of caries however, but for control of periodontal disease. He wrote: "Rinse the mouth every morning, and also in the evening before going to bed with a few spoonfuls of one's own urine, immediately after it has been emitted, always provided the individual be not ill."

His chief contributions in the periodontal field were:—

1. The recognition of the part played by sepsis in dental disease. He wrote: "Little or no care as to the cleanliness of the teeth is ordinarily the cause of all the maladies that destroy them." This was an important observation over two hundred years ago.

2. He was the first to distinguish scorbutic periodontal disease from the other types. It must be remembered that up till this time scurvy was prevalent and its cause as a specific identity unknown. This therefore accounts for much of the pessimism regarding the treatment of periodontal disease prior to this time, as scorbutic periodontal disease did not react to local treatment.

3. He propounded theories on the formation of calculus which included three causes: (a) Food debris "drying" on the tooth surfaces; (b) Exhalation of air through the mouth; (c) From the saliva, especially in sickness.

4. He referred to the splinting of loose teeth.

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Bourdet in 1757 and Jean Serre in 1791 wrote books in which they stressed the importance of oral hygiene. Kunstmann seems to have been the first to attempt surgical treatment of periodontal disease and published a book on the subject in 1772.

In the nineteenth century a more rational approach was made to the treatment of periodontal disease so that the results improved. During this century there were many devoted and outstanding men whose names deserve a place in the annals of those famous in man's struggle against disease in general.

Leonard Koecker was a truly outstanding man who wrote *Principles of Dental Surgery* in 1826 in which he incorporated a chapter entitled "Of the devastation or absorption of the gums and sockets of the teeth". This chapter is interesting as it included nearly all that is now known regarding the practical diagnosis and the conservative treatment of periodontal disease. Koecher was the first of the modern periodontists, but was not recognized for his true worth because other men could not obtain the same results particularly with the technique of subgingival curettage.

Koecher observed that periodontal disease was prevalent throughout the world affecting people of robust constitutions rather than those of delicate habits, especially after the age of thirty. He was fully aware of its deleterious effects upon the general health and recognized the following causes of the disease: the use of mercury, irregularities of the teeth, neglect of cleanliness, dental operations, smoking, spirituous liquors, and concluded that "tartar then becomes the exciting cause, so long as it is suffered to remain, so long is nature or medicine prevented from accomplishing a cure". He summarized treatment as removal of the causes and then prevention of their recurrence, and outlined a routine as follows:—

1. Remove hopelessly involved teeth, such as very loose teeth, non-vital teeth, stumps, irregularly situated teeth, molars without antagonists, and molars in which the alveolar processes have receded beyond the spaces between the fangs. He emphasized that

considerable experience and skill were required to distinguish those teeth which should be preserved.

2. Remedy operations injudiciously performed.

3. Remove every particle of tartar, this operation being performed with "great caution and tenderness".

4. Remove such remote causes as may still exist, or, if this cannot be done, counteract their influence. These may include scurvy, mercury, scrofula, etc.

5. Instruct in home care.

His deep appreciation of the importance of efficient home care, and the technique of brushing he advocated leaves little to be desired even with modern knowledge. He writes: "The dentist's care is now to be directed to the prevention of the re-accumulation of the tartar, for a perfect cure depends not only upon the entire removal of the tartar, but also on the permanent prevention of its recurrence." Using two different brushes, one lingually and the other buccally, he prescribed a method similar to a combination of the Charter's and the roll action.

He urged that splinting of mobile teeth should not be resorted to as this only leads to loosening of the firm ones. The introduction of artificial teeth should, if possible, be avoided, and if used they should be prepared with the greatest care and accuracy to prevent irritation to the gums and neighbouring teeth.

Another outstanding man of the nineteenth century was John M. Riggs, a man of strong individuality, an independent thinker, and fearless in the expression of his convictions. He was the first man to operate under general anaesthesia, extracting a tooth from Horace Wells in 1844. Although he gave many clinics and demonstrations, he wrote few articles on his favourite subject, periodontal disease, to which other men, his followers, tagged the name "Riggs' disease". His only available article, "Suppurative inflammation of the gums and absorption of the gums and alveola process", was written in 1876. Like Koecker's article this also is an education to read.

He gave a detailed description of this "scrofulous diathesis", emphasized its deleterious effects upon the general health, and recognized its insidious nature. He wrote: "None but the most vigorous constitutions can withstand this type of disease. The appetite begins to fail . . . a cup or two of strong coffee, and a few crackers constitute the sole breakfast. Languor and ennui are substituted for cheerfulness and vigour of mind and body, neuralgic pains sweep up to the face to both hemispheres of the brain. . . . This disease exists in a less annoying and less dangerous form for several years previous to the above aggravated symptoms, covering from ten to twenty years before it culminates in its miserable characteristic, the loss of the teeth or life."

He affirmed that the teeth themselves with their accumulated accretions and roughened surfaces are the exciting cause of the disease, and, as evidence of this, points out that if periodontally affected teeth are removed health of the part and of the patient is restored. He also pointed out that the condition may be artificially produced by insertion of a foreign body at the gum margin. Therefore "the true prophylactic and pathologic treatment surely would be to thoroughly and carefully remove said concretion, tartar or roughness, polish the teeth and let nature do the rest". Note how tacitly he expresses the procedure of subgingival curettage. He wrote: "Treatment requires a firm and skilled hand, a delicate and nice touch, and, I might add the transfer of the sense of sight to the finger ends. This manipulation cannot be obtained at once, but time and practice, with close and earnest study, will qualify and school the hand, and embolden the true and sensitive mind to achieve success. . . . If a speck of tartar, not larger than a small grain of gunpowder, be overlooked, the gum over it will manifest the fact by a reddened patch of the tissue several times greater than the tartar underneath." The most prolific cause of failure was, in his opinion, lack of thoroughness—an observation that is still very true to-day.

As we proceed to the other outstanding men of periodontia in the latter part of the

nineteenth century, we find that the importance of home care—omitted by Riggs—is well and truly stressed. David D. Smith was such a man. He has been termed the father of oral prophylaxis. He probably did more than any other man of his generation to impress upon the profession and the public the great importance of oral cleanliness in the prevention of all dental diseases. Men observing in his office, were amazed at his results, and often stated that they had never before seen really healthy periodontal tissues. Some of these became converts and gave up general practice to specialize in what was called "Oral prophylaxis".

David Smith was adamant in the requirements of home care, and would send patients home if their mouths showed evidence of neglect on their part after he had instituted treatment. He advocated devitalization of teeth with advanced periodontal disease on the grounds that the blood-supply to the pulp was then diverted to the periodontal structures! He maintained emphatically that the dental profession must not shirk its responsibility as regards the periodontal question. He himself was a convert, for he is said to have made the first vulcanite denture in the state of New Hampshire, and was professor of mechanical dentistry at Philadelphia Dental College. Later he became a periodontologist.

Instruments designed by William J. Younger who lived 1838–1920 are still used. He was a very skilled operator, and was probably the first to claim that reattachment took place in cases properly treated. He was insistent upon thorough curettage of root surfaces, and claimed cures in 96 per cent of his cases. He believed periodontal disease to be purely local in origin.

It is interesting to note that G. V. Black, teacher and prolific writer, understood very little about periodontia and therefore was sceptical of the results of treatment.

Other men of the nineteenth century deserving mention, especially because of their appreciation of the importance of home care, are: Fox, Harris, Lintott, Forbes, Talbot, Patterson, Fletcher, Barnes, Bowman, and Chase.

Fox in 1803 wrote of the association of the formation of calculus with lack of oral cleanliness. He pointed out that tooth-powder must not be harmful to the teeth either chemically or physically. He referred to scaling as "most useful and necessary for their preservation".

Harris in 1839 seems to have been one of the few to recommend the use of a toothpick or goose quill "to remove particles of food from between the teeth before these particles undergo chemical change".

Lintott in 1850 wrote: "The operation of removing the tartar is too frequently performed in a negligent and incompetent manner . . . if every particle be removed and the whole exposed surface, both inside and out be polished . . . all irritation will speedily subside."

Dr. Forbes apparently was a disciplinarian in his practice. In 1869 he recorded: "If by cleaning the teeth was meant when coated with tartar, the gums inflamed as a result of that accretion, it was manifestly the duty of the dentist to remove it, and restore the inflamed parts to health. But when teeth were simply dirty, a patient might with equal propriety ask his dentist to black his boots. It was not his duty to clean such teeth, but to instruct the patient how to clean them, and the material to use, etc., and the dentist should insist upon his desire that this should be thoroughly done before further operations."

Dr. Bowman showed keen insight into the habits of his professional confrères when he said "probably not more than one dentist in ten keeps his own teeth free from tartar and disease, and if he fails with all the means of cleanliness in his hands, to be clean, how can he expect his patients to be so!" Alas, how true to-day!

Dr. Chase observed: "Some teeth appear to be perfectly free from tartar to the unprofessional, but observe that little rose spot on the gum just at its edge or below its margin. There is a granule of tartar there, and its rough surface has caused the spark of inflammation which you see in the gum. Remove it!"

Talbot certainly wished to leave no doubt about the importance of the gingival crevice, for he wrote: "The patient should be instructed with the single idea in view that the gum margin is to be exercised and stimulated and not the teeth, which must be ignored."

Since the discovery of bacteria there have always been men who have ascribed them as the primary aetiological factor in periodontal disease, but there were two periods when these men were very much in prominence. 1881-85 witnessed a number of papers on this aspect urging the use of all types of magic antiseptics and serums. Again in 1912-16 vaccines were used extensively and when parasitic amœbæ were discovered in periodontal pockets many sore arms resulted from injections of emetin.

Two men who were very active at the beginning of this century were Sydney Rauh and Alfred Fones. Sydney Rauh was an idealist who spent his life educating the profession and the public in the value of preventive dentistry as a health measure. To this end he was an ardent believer in the importance of oral hygiene. He was always interested in the social responsibilities of dentistry, was concerned for the dental care of children and the under-privileged and gave freely of his time and talents to help these.

Alfred Fones, whose method of brushing is so well known, realized the important role ancillary personnel could play in the provision of a more efficient service to the people in the field of periodontia. He originated the idea of instructing young women to give prophylactic care of the teeth in dental offices, and in 1913 established in his own office the first school for dental hygienists. Passage of time has proved how sound were his convictions in this respect.

This brings us to 1914, the year in which the American Academy of Periodontology was formed and hence completes the scope of this paper.

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THE USE OF NON-IONIC SURFACE AGENTS WITH PRIMARY INVESTMENT COATINGS

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THE double investing technique is well established as a method of preparing a mould for inlay casting and it is still widely practised where vacuum investing is not used. The advantages of thus obtaining a well-consolidated matrix around the pattern and hence a smoother casting are obvious.

With larger castings a similar process can be used and the pattern can be either dipped

been overcome by adding small quantities of a non-ionic surface-active agent and mineral acid to the slurry. This also lowers the surface tension in the system and so overcomes the problem of "wetting" the pattern. Whilst most modern detergent solutions will act to lower surface tension, and are in fact used for inlay work, cationic and anionic agents may upset the pH of the investment mix,

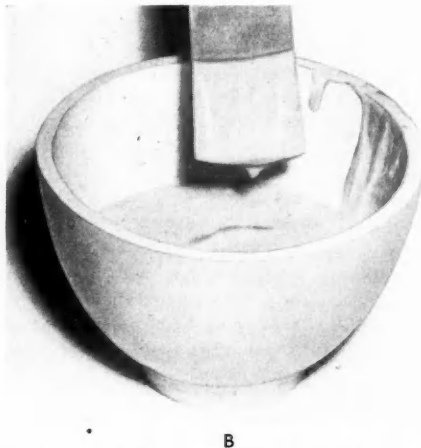


Fig. 1.—Wax strip being removed from investment mix. A, Before adding Lissapol N. B, After adding Lissapol N.

into the investment or the slurry can be sprayed or painted on to it. As with inlay patterns, the flow of the investment mix over the wax surface is impeded by surface tension and steps must be taken to facilitate "wetting" of the pattern. During researches into the use of a silica sol as a binding agent for the refractory used for casting high-temperature alloys, it was found that the resulting slurry was prone to settle out quickly, necessitating constant stirring, and this posed problems regarding the even dispersion of refractory particles within the mix. This difficulty has

particularly when silica gels are used as the bonding agent, and this will upset the predetermined setting time. They also tend to froth on mixing with water and the resulting bubble formation results in air being trapped in the investment and blebs appearing on the casting. The non-ionic agents, on the other hand, do not affect the pH and have poor foaming properties. Those which can be used for this purpose include Lissapol N, Lubrol W, and Nonex 99.

The investment chosen for primary coating should comprise a refractory of low particle

size and should contain a fair proportion of -200 +300 mesh material.

The technique is applicable to the casting of either gold or the stellite type alloys and so to investments bound either by silica gels or gypsum. With a gypsum-bound investment the non-ionic agent may be added either to the water before mixing or to the mixed slurry. If the liquid Lissapol N is used about 1 c.c. should be added for each 100 c.c. of water in the mix. Lubrol W and Nonex 99 are solids and need to be dissolved in warm water before adding. About 2 g. are required for each 100 c.c. of water in the mix.

The preparation of a dipcoat for high-temperature alloys using a colloidal suspension of silica known as Syton includes the critical addition of hydrochloric acid, which determines the degree of thickening of the mix. The addition of the non-ionic agent in this case should be carried out before the acid is added. When ethyl silicate solutions are used the non-ionic can be added direct to the slurry.

The resulting primary coating can be either applied to the pattern by means of a brush or it can be sprayed from a spray gun under a

pressure of 50 lb./sq. in. The nozzle should be held 18 in. away from the pattern and it should deliver a fine conical jet.

Having applied the primary mix it may be considered advisable to stucco the coating by the addition of a dry, coarse investment powder, thus facilitating the firm union of the primary coating with the main body of the investment mould. Setting of the primary coating should take place in 30 min. and completion of the investing process should not be carried out before this.

The efficiency of the non-ionic agent in lowering surface tension can be very simply assessed in a few moments by the following test: A normal mix of a proprietary investment is made in the usual manner and a small strip of modelling wax is dipped into it and withdrawn. The investment will fail to wet the surface and very little will adhere to the wax (Fig. 1 A). A few drops of the non-ionic agent are then added and thoroughly mixed with the investment. On dipping a similar specimen of wax into the investment it will now be found to emerge thoroughly coated in the investment mix (Fig. 1 B).

A Preliminary Report on the Solubility of Decalcified Dentine in Water

An investigation was carried out to discover over what range of water temperatures decalcified dentine would dissolve, because it was thought this might have some practical bearing on the carious process when hot beverages were imbibed.

Extracted teeth were stripped of their cementum and the dentine filed; the filings being collected on white paper. The dentine filings were then passed under a magnet to remove any metal and washed and decalcified in $N/5$ HCl and dried over concentrated sulphuric acid. Weighed amounts of decalcified material were placed in tubes along with 10 ml. of water, and one drop of chloroform to prevent bacterial growth. The tubes were then sealed and placed in ovens at temperatures ranging from 45°-60° C.

After varying intervals of time samples of the supernatant liquid were collected and

tested qualitatively for protein. This analysis showed that decalcified dentine was soluble in water at 40°-75° C. Thermocouples placed between two teeth indicated a temperature rise of 5°-15° C. when taking the drinks.

In further experiments in which decalcified dentine was in contact with many changes of water over several months, it was found that there was a progressive solution of the decalcified material. And it was concluded that the whole of the decalcified dentine is eventually soluble in water at 38° C.

These experiments have shown that decalcified dentine is soluble in water at mouth temperatures and that the solubility rate increases with rises in temperature. In the carious process, therefore, it would appear that in addition to acid decalcification and proteolysis, decalcified dentine may be rendered soluble by temperature changes alone.—CRABTREE, M. G., and ATKINSON, H. F. (1955), *Austr. J. Dent.*, 59, 340.

PARTIAL ANODONTIA

By ANDREW D. DIXON, M.D.S., B.Sc.

PARTIAL anodontia, the condition in which a variable number of teeth are congenitally absent, is not commonly encountered in general practice except in its simplest form, when the upper lateral incisors or the lower second premolars are missing from the tooth

deficient and of these 20 per cent had from 3-11 permanent teeth missing.

The following is an account of a case in which a considerable number of permanent teeth had failed to develop. It is of interest for it presents the typical clinical picture and

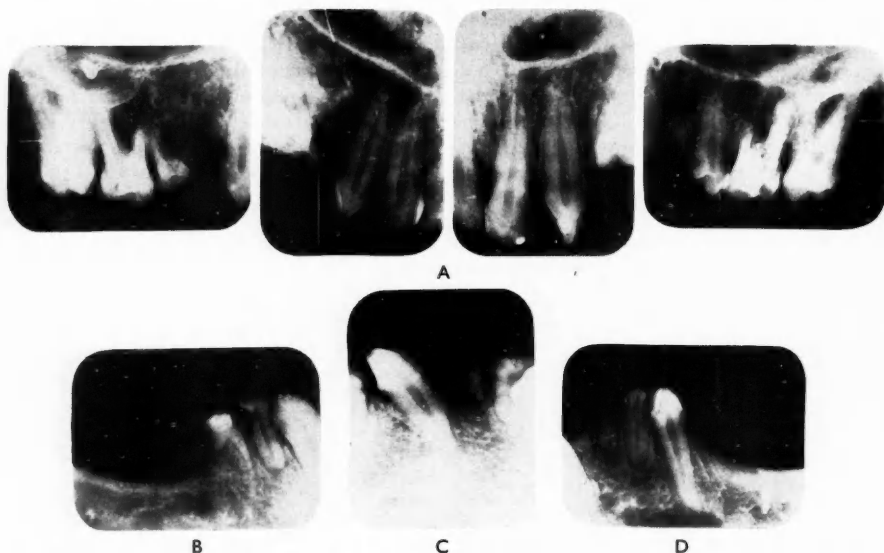


Fig. 1.—Radiographs of the dentition in a case of partial anodontia. Note at A the absence of $\overline{2}2$ and the conical form of $\overline{3}3$; in B and D the absence of several permanent teeth particularly those which normally succeed $\overline{D}AB$; in C the angulation of $\overline{3}$.

series. Moreover it is rarely observed in adults for the majority of individuals with this dental anomaly seek from the dental surgeon some form of conservative or prosthetic treatment at a relatively early age. For this reason also the literature concerning this condition is confined in the main to reports dealing with partial anodontia in children of school age (Brekhus, Oliver, and Montelius, 1944; Kennedy, 1950; Ireland, 1955). In this age group congenital absence of teeth is not of general occurrence or is it extremely rare. Dolder (1937) in a survey of 10,000 schoolchildren in Berne found 340 cases in which the number of teeth was

was the only notable case of partial anodontia observed during six years' general dental practice.

The patient, a female aged 23 years, was concerned with the appearance of her dentition and with sensitivity of anterior teeth, which was especially troublesome at meal times. Clinical examination showed that this discomfort was primarily due to the degree of attrition of the mandibular incisors, which were worn away almost to gum level. It was apparent that a number of deciduous teeth had been retained and in view of the associated abnormal position of several of the permanent

series the possibility that a number of permanent teeth had not developed was investigated.

The teeth present were $\frac{6ED3 \ 1|1 \ 3C4E6}{DC \quad | \quad 3ABC4}$

Of these the upper canines, which were conical in form, showed marked mesiolabial rotation and were almost in contact with the corresponding central incisors. A lower tooth, which resembled a canine, was only partly erupted and appeared to lie obliquely across the midline of the mouth. It was designated to the left side because of its presumed path of eruption. The upper first permanent molars were of small size, the crown dimensions being approximately equal to those of the second deciduous molars; three of the deciduous teeth were carious and it was noted that the gingival mucous membrane was comparatively healthy.

Complete radiographic examination of the mouth revealed further interesting information, Fig. 1. Firstly, that there were no unerupted teeth, the successional tooth germs

for $\frac{EDE}{D}$ being conspicuously absent, as were the permanent successors for \overline{AB} . Of the per-

manent series $\frac{7 \ 54 \ 2 \ | \ 2 \ 5 \ 7}{4321|12}$ had failed to develop and as the patient had only had a single tooth extracted some 8-10 years previously the possibility that other teeth were absent cannot be overlooked. Secondly, the position of the left lower canine was verified and its relationship to the deciduous incisors could be determined. Thirdly, the roots of the retained deciduous molars did not diverge as widely or as abruptly as is normal when the crypts of the developing premolars are to be embraced, for the presence of the permanent tooth germs influences the final curvature of the roots.

Treatment involved the extraction of $D3 \ 3C$ $\frac{DC \ 3ABC4}{D}$ under general anaesthesia and the insertion of part upper and full lower dentures.

DISCUSSION

For aesthetic and functional reasons it is rare to observe partial anodontia in an adult, particularly a female, and as the dentition can be presumed to have attained its final form

by the twenty-third year diagnosis from clinical and radiographic examination can be made with greater certainty than with persons who are more often at least five years younger. On the other hand it becomes more difficult as the age of the patient increases to recognize "true" partial anodontia for teeth may well have been extracted some years previously, in which case one must often rely entirely on the memory of the individual concerned. In this case one could accept the earlier history, that only one permanent tooth had previously been extracted and suggest that the absence of permanent teeth was due to localized failure of the dental lamina and primary enamel organ tissue to differentiate into the lamina and enamel organs of a number of permanent successors.

The importance of complete X-ray examination of the jaws extending as far posteriorly as possible, to include the mandibular ramus and maxillary tuberosity, cannot be over emphasized for partial anodontia is frequently associated with malposition of teeth. Of the malposed teeth in the case described the rotation of the upper canines and the angulation of the lower canine are noteworthy. These teeth are probably the most consistent of the mammalian dentition so that one is not surprised to find that the canine group is least affected by the reduction.

Anomalies of this type have been attributed to a hereditary factor (Thoma, 1954) and the possibility that other members of the patient's family were similarly affected had to be considered. It is unfortunate that full details of the parents' dentitions could not be ascertained, but those of a brother and a sister were quite normal.

SUMMARY

A case of partial anodontia is described and the clinical features are discussed.

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REPAIRING MESIAL DENTURE FRACTURES

By J. WILLMOTT

Two great problems with acrylic dentures are the attrition of plastic posterior teeth, and mesial fractures of full upper dentures. The posterior attrition is often the cause of the fractures, as the resultant malocclusion near the canine areas causes a new strain which was not envisaged when the teeth were articulated.

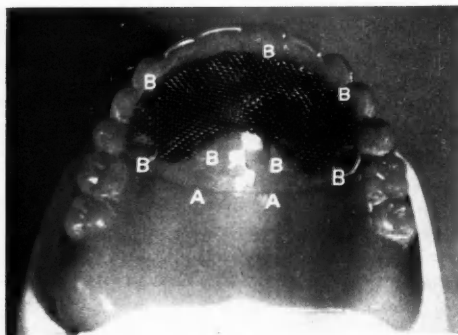


Fig. 1.

With the present weakness of acrylic materials some answer to this problem is the use of porcelain posterior teeth.

The following repair-technique has been used with considerable success. Make a plaster cast of the fitting-surface of the denture, and then pencil out the repair area on the denture. Do not bevel the edges of this area, as the cohesive property of acrylic material is inferior to that of vulcanite, and feather edges tend to roll up. Cut a vertical ditch, marked A on photo, on the edges of the area with a $\frac{1}{2}$ in. \times $\frac{1}{16}$ in. button stone. Trim over the repair area with an abrasive trimmer until it is reduced to one-third of its thickness. Prepare the edges of the fracture by dovetailing, as in vulcanite work. Coat the plaster model with an alginate separating solution, before finally replacing the denture on the model, as this cannot be done later in the flask. Take a piece of S.S. gauze (scrim), shape and fit it to the denture, as shown in the photo. This is easily done with the aid of contouring pliers, and needs no swaging. Heat the end of a single-ended

excavator in the Bunsen flame until very hot (not red). Holding the scrim firmly in position with the thumb, press the hot instrument firmly down upon one end of the scrim marked B. The plastic beneath will ooze up, and then the instrument must be slowly drawn away laterally. The plastic sets at once and one end of the scrim is secure. Repeat this process at all the strategic points of the scrim, marked B, thus making it immovable during the subsequent processing. It will also be well below the finished level of the repair area. Proceed to wax-up the repair in the normal way, investing in a flask and processing as usual. There is no need to lubricate the S.S. gauze with monomer, as the new plastic material will readily percolate through the mesh and enter the dovetails, etc., beneath (as seen in Fig. 1).

It is undesirable to use cold-curing material for a mesial repair, as maximum strength and density are required. This technique may be used for partial dentures.

The time required to prepare the repair area, fit scrim, and wax-up is about fifteen minutes.

It is obviously sensible to insert S.S. gauze when a denture is first made. If the reason for its presence is explained to a patient, it will be appreciated, especially as it does not affect the aesthetics when in the mouth.

The Effects of Single Injections of Soluble Components of "Fusospirochaetal" Materials in Experimental Animals

Inoculation with filtrates of human gingival scrapings from patients suffering from Vincent's, filtrates of experimental fusospirochaetal guinea-pig exudate or supernatant fluid from centrifuged guinea-pig fusospirochaetal exudate, into cats subgingivally, guinea-pigs subcutaneously and intraperitoneally, rabbits intravenously, and rats intraperitoneally, failed in 40 animals to produce any recognizable lesion attributable to toxicity of the inoculum.—HUNTER, H. A., and MACDONALD, J. B. (1956), *J. dent. Res.*, 35, 4.

THE DENTISTS BILL

By LAURENCE WEBLEY, LL.B., *Barrister-at-Law*

THE Dentists Act, 1956, which received the Royal Assent on March 15, will, doubtless, be regarded by practitioners as something of a landmark as it makes the profession a self-governing one with its own council. This is the main purpose of the Bill, which also deals with ancillary dental workers and, in effect, prohibits the carrying on of dentistry as a business by corporate bodies. It will come into force on a day to be appointed.

The Bill begins, "With a view to making the dental profession a self-governing profession", by setting up a General Dental Council with a registered dentist as President. The Dental Board, which was to some extent controlled by the General Medical Council, is abolished.

The General Dental Council is to be a body corporate with a common seal and the power to own property. It will comprise 18 members, 11 elected by dentists from among themselves, 3 also dentists, nominated by the Queen, and 4 non-dentists, nominated by the Queen and the Governor of Northern Ireland. In addition further members, all dentists, will be nominated by the various dental authorities in the proportion of 1 each save for the University of London, which is allowed 2 members. Finally, the General Medical Council will nominate 6 members who will be limited to acting only in matters connected with dental education.

The composition of this Council is, of course, of great interest and importance because it is charged, under the Act, with the promotion of high standards of professional education and conduct, the discipline and education of the profession, and the maintenance of the Dentists Register. It is provided that the functions of discipline and education shall be exercised through committees.

The Disciplinary Committee is to consist of the President and 10 other members of the General Dental Council, of whom 4 must be elected members and at least 2 members must be non-dentists. This Committee will be assisted in its work by a committee for the

preliminary consideration of disciplinary cases consisting of the President and 5 members, who may all be dentists except 1 member. This preliminary committee will have the task of deciding whether a case arising under Sect. 13 of the Dentists Act, 1878 (registered dentist convicted of crime or guilty of infamous or disgraceful professional conduct) ought to be referred to the Disciplinary Committee to be dealt with. In short, it must, presumably, decide whether there is a *prima facie* case.

The Disciplinary Committee has the duty of inquiring into such cases and, if necessary, erasing the name of the person concerned from the Register. The person affected will be entitled to be heard and to be represented by counsel or solicitor, and the Committee will be advised by a lawyer on legal question. A right of appeal from the finding of the Committee to the Privy Council is provided. The former right of appeal which lay to the High Court in respect of findings of the Dental Board, does not now lie in reference to determinations of this kind. There are provisions for co-operation with the Dental Board of the Irish Republic in these matters.

It is convenient, at this point, to consider the provisions regarding the Register. This will, of course, be kept by the General Dental Council, which may make all necessary regulations concerning it. It should be noted that, apart from cases under Sect. 13 of the Act of 1878, the Act provides that where a person's name has been erased at his request, or because he has ceased to practise, his name may be restored to the Register upon his application unless, of course, the original entry was incorrect or fraudulent. But the right of appeal to the High Court against failure or refusal to register a name upon such an application, or against the removal of a person's name on grounds other than those in Sect. 13 of the Act of 1878, granted by Sect. 9 of the Dentists Act, 1921, is abolished. This would appear to give the General Dental Council a virtually complete discretion, subject to Sect. 3 of

the 1921 Act, as to registration apart from cases under Sect. 13 of the Act of 1878, although Sect. 9 of the 1921 Act is not formally repealed.

A new procedure is provided for the registration of colonial and foreign dentists in what are now termed the "Commonwealth" and "Foreign" lists. Such dentists are entitled to be registered if they can satisfy the Council as to their character, knowledge, and skill.

A registered dentist becomes entitled to use the description "dental surgeon" by virtue of his registration and it is open to the Council to prescribe appropriate titles for any branch of dentistry which, in its view, has become so distinctive as to justify such a distinction on the ground of professional and public convenience.

The Act prohibits the carrying on of the business of dentistry by an individual, not a registered dentist or medical practitioner, unless he was in business on July 21, 1955. If he does so he becomes liable to a fine of £500 on indictment. Moreover, the carrying on of such business by corporate bodies permitted, subject to certain conditions, by Sect. 5 of the Dentists Act, 1921, is now prohibited unless it was existing and carrying on business on July 21, 1955, or came into existence subsequently through the reconstruction or amalgamation of businesses functioning on that date, or is registered under the Provident Societies Acts. The Council may, however, prohibit a corporate body from carrying on further business if it, or one of its directors, is found to have contravened the 1921 Act or been guilty of misconduct. In addition, where a member of the operating staff of such a body is found guilty of professional misconduct, instigated or connived at by a director, or of which the director knew or reasonably should have known, the Council may, similarly, prohibit its continuance in business. There is a right of appeal to the Privy Council.

The Act contains exceptions to the foregoing prohibitions in favour of personal representatives, widows or children of deceased registered dentists or medical practitioners, who may carry on his business of dentistry for 3 years, or for life in the case of a widow whose husband died before the Act. The meaning of "business of dentistry" is defined

as the receipt of payments for services rendered in the course or practice of dentistry. However, Public Authorities providing national or local dental services, employers providing non-profit-making dental treatment for employees, individuals doing likewise, and payments in respect of emergency extractions by chemists, are excepted. Dental work undertaken by students as part of a course of instruction does not amount to the practice of dentistry.

The Act empowers the General Dental Council to establish classes of ancillary dental workers, to prescribe the necessary qualifications and the work which they may undertake, and to establish rolls or records. The Council may permit them to undertake work which would, otherwise, come within the prohibition as to the "practice of dentistry" by persons other than registered dentists, contained in the 1921 Act. However, there are a number of restrictions upon the employment of these ancillary dental workers and, in general, work amounting to the "practice of dentistry" must be performed under the direction or direct supervision of a registered dentist. The Act contains an interesting provision for the establishment of an experimental training scheme, which may be instituted by the Council on the requirement of the Privy Council, to judge the public value of a class of such workers permitted to undertake fillings and the extraction of deciduous teeth under the Health Services. It is suggested in the Memorandum to the Bill that the initial expenditure on such a scheme will be £20,000 with an annual expenditure of £35,000. There will be a Treasury contribution to this cost.

Finally, reference must be made to the important provisions for education within the profession. The Education Committee is to consist of the President and 8 registered dentist members, together with the 6 members nominated to the Dental Council by the General Medical Council for this purpose. It is provided that the chairman of this committee shall be a dentist. The Council may appoint visitors to report as to the sufficiency of the instruction in centres where dental training is being given, and all the functions of the General Medical Council as to courses of study

and examinations are transferred to the General Dental Council. It is, by the way, provided that Sect. 28 of the Dentists Act, 1878, which has not yet come into force, shall not, now, do so!

Such, in outline, are the main features of this Act. It provides a framework within which the dental calling can, and, no doubt, will, develop as a fully self-governing and autonomous profession.

DENTAL BOARD OF THE UNITED KINGDOM

Chairman's Address at the Opening of the Seventieth Session, May 9, 1956

GENTLEMEN,

At this, the last session of the Board, it gives me particular pleasure to have the opportunity, on your behalf, of congratulating Frederick Ballard on his appointment to be an officer of the Order of the British Empire. Although we have already done this privately, it would be a serious oversight if the warmth with which we welcome the honour conferred upon our old friend went unrecorded in the canon of these Addresses. Among his colleagues it is widely appreciated that for most of his life Mr. Ballard has worked tirelessly and unselfishly for the good of his profession. On this Board, of which he has been a member for twenty years and a Treasurer for sixteen, our most cordial appreciation is perhaps reserved for the emphasis which he has always put upon human relationships and for his unflinching concern for the well-being of his fellow-members and of our staff.

For some ten years we in the dental world have been anticipating the events of the last few months—events that would bring to an end the existence of this Board and establish dentistry as an independent profession in the United Kingdom. Indeed, before the war the first Chairman of the Board said that he felt that the time had come to establish this autonomy, and there can be little doubt that if war had not intervened steps would have been taken to establish an independent Council years ago.

It does not, however, follow that the delay has been altogether a disadvantage. The time that has elapsed has provided an opportunity for us in the dental profession to adjust our minds to our new responsibilities and it is very questionable whether we should have been so well able to shoulder the responsibilities laid upon us by Parliament in this Act if it had been passed fifteen, ten, or even three years ago.

In May of 1952, when the Dentists Bill was last before Parliament, I gave a lengthy summary of the activities of the Board up to that time, and it may not be inappropriate now to reflect for a moment or two on the changes brought about by those activities which were prompted by the Act of 1921. The original members of the Board addressed themselves to a scrutiny of nearly 11,000 new applicants for registration. About a quarter of these were rejected and of the rest some were examined and some accepted without examination, and at least an attempt was made to provide instruction for those who sought it. Despite internal turbulence, there was at last a closed profession, a central authority and the machinery to enforce discipline. The Dental Schools were encouraged to appoint whole-time professional teachers. An academic cadre was established and the teaching in the schools systematized. Graduated students began to replace those who had been content to take a diploma, and the dental curriculum became a highly respected

discipline within the Universities. Building and equipment grants were made available out of the Board's funds and bursaries were provided on such an extensive scale that more than a quarter of all the United Kingdom graduates and licentiates whose names were added to the register between 1921 and 1939 had received financial help from the Board. The profession was taxed to provide the money, but it could hardly have made a better investment. The 1939-45 war found an educated and disciplined profession able to expand the well-established services in the Armed Forces of the Crown, whose fine organization thus enabled them all to play an indispensable part in the war.

At the end of the struggle, when men were returning to civil life and might have been lost to the teaching profession, the Board were able to draw on their reserves and enable the Schools to attract the teachers they needed to cope with the heavy post-war intake of students. A Postgraduate Bureau was set up which flourished in the hands of its Director, whose special genius found a natural outlet in co-ordinating information concerning the resources of the Schools and making it available to those who sought postgraduate instruction. A postgraduate institute was established at the Eastman Clinic under the auspices of the British Postgraduate Medical Federation, thus realizing what had at the time seemed to be little more than a pious hope of the Board's war-time "Clinical Investigation Committee".

There have, however, been two other sides of the Board's work which have suffered from lack of funds, though not from lack of effort. Dental health education of the public has been constantly pursued and the most valuable material produced, but even if the entire surplus income of the Board were devoted to this work, it would be insufficient to bring to the notice of the people and keep before them the necessary instruction. We are sure, however, that this work is not lost and that we may be on the eve of developments that will crown a long and arduous struggle.

The other pressing need of our profession to which the Board have been unable to make a decisive contribution has been research. As early as 1923 the Board were amongst the first to make grants available to dental research workers and they continued to do so until the war, but here again it is lack of funds that has hampered the expansion of a most promising innovation. The ultimate need of dentistry is for a National Institute of Dental Research related to other departments for biological investigation, where a training and a career in research would be open to the right kind of young man or woman who could then take full advantage with his medical opposite number of the Treasury grants available for medical research. In the meantime the Nuffield Foundation have rendered an invaluable service to

dentistry and to the community by training dental research workers and teachers. One of their earliest fellows has just been appointed to a professorial chair, and anyone who visited the recent annual meeting of the British Division of the International Association for Dental Research must have been left in no doubt about the importance of the work that the Nuffield Foundation is doing.

If we wish to summarize all this activity, there can perhaps be no better way of doing so than to say that during the years that the Dental Board have exercised this modified control, the number of diplomates and graduates has grown from 4768 to 12,521, than which there could hardly be more convincing evidence that the profession is in robust health. Yet the heavy burden laid upon it by the National Health Service is greater than it can bear without an even greater rate of expansion. The Schools have places for an entry of some 650 students a year. That is more than enough for a profession of 13,000 graduates—our present size—but it is not enough for the needs of the community and that is why we have set on foot the extensive recruitment campaign to which I referred at the last session of the Board. It is very gratifying to see that the Schools are rapidly filling up again, but this does not mean, of course, that enough young men and women are being trained in dentistry to meet the country's needs for dental treatment—nearly a thousand new students a year would be needed to produce a register of 20,000 names at the end of twenty years—but it does show that the public are beginning to realize the attraction and scope of a career in dentistry to-day.

This may be an appropriate point at which to refer to the Dentists Register for 1956, which has now been published. The total number of names in it, 15,895, represents an increase of 202 during the year. It is interesting, too, to note that the last "Colonial List" to appear under this title is also by far the largest. In the next few years the register must suffer an attack on two fronts, for the rate of loss will continue to increase under the influence of accelerated retirement, while new registrations will reflect the drop in the entry into the dental schools which has so much alarmed us in recent years. The numbers in the register must then decline rapidly, but in the meantime we can derive some consolation from the fact that the descent will start from a point much higher than at one time seemed probable.

Now that the Board have published their last Register it is appropriate to record that thirty-five Registers have been printed since the Board was established and that the first of these had 5831 names, some 10,000 fewer than the last. The proportion of dentists registered as graduates and licentiates, starting at 83 per cent in the Register for 1922 was 40 per cent in 1924, 50 per cent in 1932, and is now 82 per cent. The total number of dentists registered under the provisions of the 1921 and 1923 Acts stands at 8647 and the number still remaining in the Register is 2827. The Register has, of course, been published in every year without exception since the passing of the Act of 1878 and I know you will be interested to hear that the first Register, printed in 1879, contains one name which has appeared in all seventy-seven Registers published since: Mr. Frank Julian Hartley, registered under the Act of 1878 and Licentiate of the Royal College of Surgeons in Ireland in 1881, is still living in Birkdale, though he has retired from practice. We offer him our congratulations. Long may his name continue to appear.

I am quite sure it would be your wish that in this Address at the final session of the Dental Board, I should make acknowledgment of the debt we owe to the General Medical Council. For thirty-five years the Council have supervised the disciplinary functions and finances of the Board as well as performing other duties in connexion with our profession that are now to be assumed by the new General Dental Council. In relation to finance they have never sought to curb our enthusiasm or interfere in the schemes we have initiated for the welfare of the profession or of the public in relation to dentistry. In disciplinary matters they have performed a function from which any less assured body might well have flinched, for they were never allowed to examine witnesses or re-try our cases. Yet they have helped us in disciplinary matters in three outstanding ways. In the first place they have always appointed three of their most eminent members to represent them on this Board and we have derived great pleasure from their company as well as profit from their advice in every department of our work. We are happy to know that this association will continue, even if less closely, between the General Medical Council and the new Dental Council. Secondly, the Council have been able to influence our decision on one or two occasions as to the kind of conduct we ought not to regard as disgraceful, and thirdly they have shown us by the decisions they have reached in their own disciplinary cases the kind of conduct we ought to regard as disgraceful.

Nevertheless we have to a great extent had to develop our own professional code of ethics. As a new profession we are particularly sensitive to certain kinds of unprofessional conduct and the General Medical Council appreciated this, though some of our earlier decisions must have seemed stern and even harsh to a profession more experienced and confident of its unassailable position in the life of the community. During the past eight years, however, which have seen the introduction of social dentistry on a universal scale, we have been presented with problems of discipline in the conduct of practice which have no counterpart in medicine. It has fallen to this Board to determine a code of conduct quite separate from the Regulations of Ministers or the decisions of Parliament, a code born of experience and embodied in case history, largely an unwritten code, as is, I believe, much of our common law, and indeed just as British in its mode of origin, elasticity, and in the respect with which it is, for the most part, observed.

It is, however, in matters of education that we have been most dependent on the General Medical Council and here, too, their attitude towards us could not have shown a more complete or sympathetic appreciation of our problems. As an example of this I may cite the Special Committee on Dental Curriculum appointed by the Council which reported in 1952, on which dental teachers and practitioners were most adequately represented. Indeed the composition of that committee followed as nearly as possible the arrangements recommended by both Board and Council to the Teviot Committee and now embodied in the Act of 1956.

There is one other aspect of our association with the Council to which I would like to refer. We have enjoyed the use of their dining and ante rooms, with all the facilities that go with them, for many years and, while we have provided accommodation for their committees and for the Pharmacopœia Commission on our side of the building in return, we can recall many happy occasions which have owed much of their pleasure and profit

to the amenities put at our disposal by the Council. Our farewell to them is more than slightly tinged with sadness—yet if with the Roman gladiators we say to them “we who are about to die salute you”, they may reflect that unlike the gladiators we propose to be reincarnate and to return to trouble Caesar—this time bringing with us no small addition to our numbers, who will hope to be allowed to share the comforts of our erstwhile mutual home. I am happy to be able to announce that the Council have added to their many kindnesses an offer to allow the new body to assemble in their Council Chamber at any rate for the time being and to use the amenities of their lounge and dining room for their leisure and refreshment. This is more particularly generous of the General Medical Council because all that the new Dental Council will be able to offer in exchange is inconvenience and the loss of some of the amenities the Board have been able to put at the disposal of the Council in return for the comfort they have enjoyed. One of the first problems the new body will have to consider is therefore that of accommodation, but the General Medical Council have made it possible for them to hold their first meetings conveniently and with proper dignity.

Nor are the members of the General Medical Council the only friends outside our own number to whom we owe a profound debt of gratitude for the goodwill with which they have placed their skills at our disposal and worked with us to those ends which we have sought to serve. I refer particularly to those who have borne the burden of putting into effect our policy of public education in dental health by serving at one time or another on our advisory committees. Their task has been no sinecure: they have met together often and through compromise found solutions to difficult problems, with scarcely adequate means at their disposal and sometimes, I am afraid, with scant recognition of their work. I would also like to mention the Visual Education Committee, where eminent and busy men have found the time to view and compare films and photographs and so help us to build up our useful library of educational material. I know, too, that you would like me to thank those experts in the field of secondary and university education who have given us such valuable assistance with our plans to improve recruitment; nor shall we forget our debt to those who have given lectures and written or edited books as part of our postgraduate or post-registration courses or in connection with dental health education.

There is another tribute that I know you would also wish me to pay. It is to those who have been members of former Boards and particularly those members who first established this Board. Of these none survives, but looking back we see the names of men who have passed into the history of our profession. Not all of course were dentists. Sir Francis Dyke Acland, whose portrait now looks down from the wall behind me upon the last meeting of this Board that he did so much to create, will always be associated with the early establishment of dentistry as a profession in this country. He presided over the Departmental Committee and exerted an important influence on the substance of the Act which brought the Board into existence. Similarly, when it was established, he had a major responsibility as their first chairman for designing what he called a “halfway house” in the profession's journey along the road to self-government. There was much criticism of the 1921 Act at the time, but from the perspective of only a third of a century

we can already perceive—as I have tried to show—that it did no harm; and indeed much good has come of it.

I cannot, of course, pause to recall all the members of that Board by name, though as they pass before us in our memory we rejoice to find their footsteps deeply printed in the sands of time. Of those who worked with them, Norman King, our first Registrar, was shared by us with the General Medical Council of those days. He, with his Chairman, shouldered the responsibility of shaping the early policies of the Board that did so much to stimulate recruitment and encourage higher standards of dental education and discipline. To most of us, however, he remains a shadowy figure who first put our names on the register. His successor, Michael Heseltine, was known to all of us, and most of us at one time or another came under the spell of his personal charm. His meticulous accuracy set a standard by which we still may try to measure our achievements; his judgement was unerring and his assessment of a situation uncanny, and sometimes disconcerting, in the clarity of its perception. He, too, was for most of his time responsible to both the Council and the Board.

In recent years the Board have lost two other good servants. Thomas Kemm, whose retirement was cut short all too soon, was an old and trusted friend. We felt his loss keenly. Miss Baker, who left us less than three years ago after completing thirty-two years with the Board, nearly half of them as our Chief Clerk, we shall always remember with particular appreciation for the devoted service which enabled the Board to continue to carry out their duties during the difficult years of the second war.

But I should be guilty of scant courtesy and should be setting an entirely wrong perspective if I left the impression that “The glory hath departed”. I believe the present Board in their last years and in the policies referred to are as constructive in their approach, as tireless in their energy, and have shown the same devotion to the welfare of the profession as their precursors.

Our present Registrar has now been with us nearly as long as either of his predecessors. We have come to appreciate his unflinching good humour with a body that prides itself on the sturdy independence of its members' views, and we have learnt to rely upon his competence and vigilance in ordering our affairs. The loyal and efficient service which we have consistently received from our staff, and which I cannot praise too highly, is in part a tribute to his administration. It is also in part a reflection of our good fortune in finding in Mr. Turner, who has been with us for twenty-seven years, not only an expert Accountant but a man whose qualities of character have made him an efficient, trusted, and popular controller of our office. But, as they would at once point out, you cannot conjure out of people virtues that are not in them, and I should like to express particular admiration of the way in which, in these last few months, every member of our staff has contributed to surmounting the unforeseen difficulties which have disrupted our well-laid plans for the impending constitutional change. They have risen to the occasion to such effect that, while the preparations for the introduction of the new order are going smoothly forward, our own last rites have not been in the smallest degree neglected.

It is pleasing to be able to announce that at this, our last session, we have only one discipline case; but we have much business to transact in handing over to our successors and thereby closing a chapter in the history of our profession in the United Kingdom.

PARLIAMENTARY NEWS

Mr. J. Baird (Lab., Wolverhampton N.E.) speaking in the debate on the (Guillebaud) Report of the Committee of Inquiry into the cost of the National Health Service in the Commons on Monday, May 7 said he hoped the Minister would look at the suggestion in the Report that where people were attending a dentist regularly for conservative treatment they should be charged £1 not every six months but every twelve months.

"I hope the Government will look at it again. It does not encourage people to go along to have regular consultations and regular treatment.

"But the major problem so far as the dental aspect is concerned is the question of shortage of manpower", he continued. "It is very serious indeed. We must first of all get more dentists and prevent dental decay as much as possible to save dental manpower."

He said there was a committee sitting at the moment on the question of manpower. The House would be glad to know, however, that while for some years dental schools had only been half full to-day the position had altered. He said if the committee's report suggested there should be more dentists trained then there would be a grave problem. They could not be obtained unless the Ministry and Treasury were willing to spend money in building new dental schools and converting old buildings.

Mr. Baird suggested there should be a school taking at least 100 students a year in Wales. There was also an argument for a dental school in Aberdeen.

"Some of my dental friends say one of our major problems is this question of prestige. Would the Minister look at the possibility of setting up a dental faculty at either Oxford or Cambridge? It would help prestige and give us room for more students."

He recalled that University College Hospital in London had only room for an annual intake of 25 students. More room could be made for students in present schools. If students were wanted then we had to pay for their education. The trouble was some authorities encouraged students more than others, and he urged a co-ordinated policy to encourage more men and women into the dental profession.

Finally on the question of preventive dentistry, he referred to water fluoridation experiments going on in certain local authority areas, but pointed out that like many other innovations it caused a certain amount of antagonism in some circles.

He hoped before long there would be fluoridation throughout the country.

Earlier in his speech, Mr. Baird, who said he was a practising dentist, had suggested that if the manufacturers of proprietary medicines and drugs did not put their own house in order, the Government must step in and see they had public control over the drug industry.

"I myself have seen instances as far as tooth-paste is concerned, where on wireless, TV and in advertisements, they are claiming qualities which do not exist and which are fundamentally doing harm because people believe that in buying tooth-paste they are curing dental decay."

Sir Hugh Linstead (C., Putney) also referred to the dental profession. "There is a great deal of anxiety in the dental profession about their position and their status in the future. It is not merely a matter of dental schools. It is a matter of giving to that profession a feeling that they really matter in things so that young men and women are anxious to come in as students."

Col. M. Stoddart-Scott (C., Ripon) said the Report confirmed the priority of the dental service. The words "priority dental service" were written into the Bill. In the next 5 years the priority dental service took not first but second priority. The number of dentists in the priority service fell while Labour were in office by no less than 25 per cent. The Report was wise to bring out the fact that if we were to have a priority dental service we must see that there was some approximation between the salaries of those in the school dental service and those of dental practitioners doing private practice.

Mr. Baird intervened to say there were about 1000 dentists in the school dental service now. The former Minister of Health in an earlier debate had said that we required between 2000 and 3000 dentists if we were to have an adequate school dental service.

There was nothing in the plans of the present Government to give us an adequate school dental service.

Col. Stoddart-Scott replied that some school dental services had more dentists now than at any time previously. That was a step in the right direction, whereas, when Labour were in power the number of dentists in the school service diminished by a quarter.

He recalled that Mr. Baird had had much to say about the dental charges but it was his Party (Labour) who first imposed them.

Although Mr. Baird regarded them as a fundamental breach in our Health Service the Report suggested that they should not be taken off until there were sufficient dentists.

In view of the number of people going into dentistry—although there had been an increase this year—and of the rate at which dentists retired, that could never occur in the lifetime of anyone present in the House.

Mr. J. Nixon-Browne (Joint Parliamentary Secretary of State, Scottish Office) replying to the Debate, stated that the McNair Committee Report on recruitment for dental services was expected in late September.

He voiced approval of the "constructive speech" made by Mr. Baird earlier in the Debate which he knew would help recruiting. "The Government will do everything they can to help that policy."

Referring to charges affecting various members of the community, he said this was something about which they must all be very worried. "National Assistance Board repayment of charges imposed in the family practitioner services during 1955 are estimated, for Great Britain, to be £1.14 million made up as follows:—Dental and denture charges, £243,000; ophthalmic charges £451,000; and prescription charges £455,000.

"Refunds of denture and dental treatment charges were made in 71,000 cases or approximately 1½ per cent of the total number of cases in which charges were levied. Refunds of ophthalmic charges were made in 260,000 cases, representing over 6 per cent of the total and refunds in respect of prescription charges were made in respect of 9 million prescriptions, also representing about 6 per cent of the total number of prescription forms.

"People who do need National Assistance are, in fact, going to the National Assistance and getting that help.

"The U.K. mission which visited the U.S. and Canada in 1952 confirmed that fluoridation in America justified the claim which had been made for it—a reduction of about 60 per cent in dental caries among children up to six years of age who lived in areas where water has been

artificially fluoridated with a trace element of one part per million of fluoride in the water.

"The mission found a complete absence of evidence that fluoridation was any danger to the general community, and recommended that fluoride should be added to the water supply in a few selected areas which should be regarded as study centres.

"These studies are being undertaken now, not because there is thought to be any danger at all but to obtain the fullest information on the conditions ruling in this

country, particularly of the dietary habits of the people and the consumption and composition of the water, and also, I understand, how it affects whisky and whether it kills goldfish.

"Four areas have been selected for these studies, Kilmarnock, in Scotland, and Andover, Anglesey and Watford, in England and Wales. Fluoridation in Anglesey started in November last and in Kilmarnock it started on April 19. It should begin in Andover and Watford fairly soon."

BOOK REVIEWS

DENTAL PRACTITIONERS' FORMULARY, 1955. For use in the National Health Service. $6\frac{1}{2} \times 4$ in. Pp. 36. 1955. London: The Pharmaceutical Press. 2s. 6d.

The publication of the second edition of the *Dental Practitioners' Formulary*, which has recently been distributed to practitioners providing general dental services, was rather overdue, following by some months the publication of the third edition of the *National Formulary*.

The new edition is essentially similar in layout to the first, but there have been some deletions and additions. The most notable of the deletions are the three barbiturate tablets—Barbitone, Barbitone Sodium, and Hexobarbitone. This is an advantage rather than otherwise to the dentists who may have previously been confused by the superfluity of hypnotic drugs, making a suitable choice difficult.

The indications for the powerful and long-acting Barbitone and Hexobarbitone are rare or non-existent in dental practice.

The additions include Penicillin for administration by the parenteral route and by mouth. It is to be hoped that tablets of Penicillin V will be added later, in view of their greater efficiency and the greater convenience of oral administration for the dentist.

It is understood that this second edition of the *Formulary* is an interim measure, pending a more radical revision and expansion at a fairly early date.

The profession will note with satisfaction that there is now a permanent standing sub-committee under the Chairmanship of Dr. R. Fairhurst, who is one of the three B.D.A. representatives. Mr. Richardson of the B.D.A.

is one of the Joint Secretaries. This committee should provide machinery for the early and smooth inclusion of additions and modifications to subsequent editions of the *Dental Practitioners' Formulary*.

ORAL AND DENTAL DIAGNOSIS. By K. H. THOMA, D.M.D., F.D.S., and H. B. ROBINSON, D.D.S., M.S. Fourth Edition. $9\frac{1}{4} \times 6\frac{1}{2}$ in. Pp. 449, with 928 illustrations, 55 in colour. 1955. London: W. B. Saunders Co. 73s. 6d.

The first three editions of Thoma's "Oral and Dental Diagnosis" are already firm favourites with the dental profession. Excellent though these editions were, they are now surpassed by the present edition which has been completely reorganized and revised with the help of the co-author, Dr. Robinson. The illustrations and the text are beautifully presented. Even the paper and the print are of superior quality compared with previous editions.

This book contains just the right amount of information which gives it value to the general dental practitioner as a reference book, while it is also an invaluable aid to both the undergraduate and postgraduate student. As the title suggests, the emphasis is on oral diagnosis, with almost a quarter of the book devoted to the principles underlying history taking, clinical examination and special investigations. The rest of the book is mainly devoted to the main clinical features of lesions which are grouped on an organ basis, i.e., lesions of the lips are described separately from those on the tongue.

The authors can be justly proud of this book, for it has set a new standard in dental text-books.

B. E. D. C.

MINISTRY OF HEALTH NOTES

Dental Manpower in the Forces

THE Ministry of Health and the Department of Health for Scotland announce that a Dental Manpower Committee has been appointed in consultation with the dental profession to advise on the allocation and recruitment to H.M. Forces of dentists liable for National Service, and ancillary matters.

Mr. J. P. Dodds, C.B., of the Ministry of Health, has been appointed Chairman.

The members are:—

Mr. J. P. Cocker, F.D.S. R.C.S., L.D.S., Mr. T. H. Liptrot, L.D.S., Mr. R. G. Swiss, L.D.S. R.C.S., Mr. W. R. Tattersall, H.D.D., F.D.S., L.D.S.; representing the British Dental Association.

Sir William Kelsey Fry, C.B.E., M.C., F.R.C.S., F.D.S. R.C.S.; representing the Faculty of Dental Surgery, Royal College of Surgeons, England.

Mr. F. G. Gibbs, F.R.C.P., F.R.C.S., F.D.S.; representing the Royal College of Surgeons, Edinburgh.

Professor J. Aitchison, B.Sc., H.D.D., D.D.O., F.D.S.; representing the Royal Faculty of Physicians and Surgeons, Glasgow.

Professor W. E. Herbert, M.R.C.S., F.D.S.; representing the Association of Dental Hospitals.

Professor R. V. Bradlaw, C.B.E., D.D.S., M.D.S., F.R.C.S., F.D.S. R.C.S.; representing the Dental Education Advisory Council.

Surgeon Rear Admiral (D) L. B. Osborne, F.D.S. R.C.S., L.D.S., Q.H.D.S., Colonel H. S. Golding, B.D.S., Wing Commander E. M. Poole, L.D.S. R.C.S.; appointed by the Service Departments.

Dr. W. G. Senior, C.B.E., Ph.D., F.D.S. R.C.S., Mr. N. C. Rowland; appointed by the Ministry of Health.

Dr. T. H. J. Douglas, C.B.E., F.R.F.P.S. (Glas.), F.D.S. R.C.S. (Eng.), L.R.C.P. (Edin.), L.R.C.S. (Edin.), appointed by the Department of Health for Scotland.

Dr. A. T. Wynne, M.B., Ch.B., B.D.S., F.D.S. R.C.S., appointed by the Ministry of Education.

Mr. S. Price, appointed by the Ministry of Labour and National Service.

The Joint Secretaries are: Mr. F. Bliss, O.B.E., of the Ministry of Health, and Mr. S. Donald Cox, M.B.E., of the British Dental Association.

CHRISTIAN DENTAL FELLOWSHIP

(Dental Section of Graduates' Fellowship of the Inter-varsity Fellowship of Evangelical Unions)

A Missionary Tea has been arranged during the Annual Meetings of the British Dental Association in Brighton in June. It will be held on Wednesday, June 27, at 4.30 p.m. at the Tatler Restaurant, Old Steine, Brighton (quite close to where the Demonstrations and Films are being held that afternoon), and following the Tea the film "Time and Eternity" will be shown. The proceedings will conclude by 6.0 p.m. to allow those attending to arrive on time at the Annual Dinner that same evening. All members of the profession attending the Annual Meetings, their wives and friends will be welcome at this tea; cost of the tea will be 3s. 6d., and admission will be by tickets obtainable from Douglas Munns, B.D., 13, Derwent Road, Palmers Green, London, N.13, who will also be pleased to supply further information regarding the Fellowship.

The Effect of Single and Multiple Tooth-brushing in the Cleansing of the Normal and Periodontally Involved Dentition

An estimate of the value of the frequency of brushing was made by studying three groups of subjects. The first group consisted of 8 persons with intact dentitions and gingivæ; the second, of 12 persons with complete dentitions, but having received periodontal treatment which is not specified; and the third group of 6 persons with intact dentitions and periodontal disease which had not been treated. All participants were taught the modified Stillman-McCall brushing technique until they were proficient. They were then directed to brush one side of the mouth once

daily and the other side before breakfast, after lunch, and after dinner. Frequent examinations of the state of oral hygiene were made, and the duration of the experiment was two months.

In those persons whose periodontal tissues had never been diseased, the frequency of brushing had no significance. Where periodontal disease was present, however, a simple daily brushing was insufficient, whilst in those who had received periodontal treatment, debris was found to a far greater degree on the side which received only a single daily brushing, most of the debris being found in the interdental space created by the previously existing disease process.—GOLDMAN, H. M. (1956), *Oral Surg.*, 9, 203.